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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,505	05/17/2007	Barrie Dudley Brewster	M03B192	3466
20411	7590	03/18/2008		
THE BOC GROUP, INC. 575 MOUNTAIN AVENUE MURRAY HILL, NJ 07974-2064			EXAMINER LIU, MICHAEL	
			ART UNIT 2851	PAPER NUMBER
			MAIL DATE 03/18/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/576,505	<b>Applicant(s)</b> BREWSTER, BARRIE DUDLEY	
	<b>Examiner</b> Michael Liu	<b>Art Unit</b> 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20060418</u> .  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Receipt is acknowledged of the Preliminary Amendment filed April 18, 2006. Claims 1-10 have been amended and claim 11 has been canceled by this amendment.
2. The International Search Report of the application PCT/GB2004/004020, which is the parent of the instant application, has been considered. The ISR contains an X reference (EP 1,329,772) that has been considered by the examiner. In the rejection, the examiner makes use of the US equivalent to the X reference.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show inlet 12 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

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Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

5. The abstract of the disclosure is objected to because of legal language present.

The word "comprises" should be revised to --includes--. Correction is required. See MPEP § 608.01(b).

The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Extreme ultra violet lithography apparatus with cryogenic vacuum pump.

***Claim Objections***

7. Claim 6 is objected to because of the following informalities: “and Joule-Thomson refrigerator” should be changed to --and a Joule-Thomson refrigerator--. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-5 and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Bakker et al (2003/0142280).

**Re claims 1 and 7:** Bakker discloses a lithography apparatus [Fig 2] comprising a lithography tool 1 housed in a first chamber 13, a source of radiation LA at or below ultra violet wavelengths [par 0021] housed in a second chamber 11 and 12 connected to the first chamber to enable radiation generated by the source to be supplied to the tool [par 0041], means for supplying target material to the source [par 0013: “a jet of...clustered xenon may be ejected from a nozzle”], pump means [cryopump 4] in fluid communication with the second chamber for drawing a gaseous flow from the second chamber [par 0040: “remove gas from the buffer zone 12”] and conveying the drawn gaseous flow to cryogenic purification means 4 for recovering the target material from the flow [par 0040: “selectively remove xenon from a mixture of xenon and helium or argon”] for subsequent re-supply to the source [par 0018: “the gases used in the

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source...can be regenerated for re-use relatively cheaply"], wherein at least one of the first and second chambers is in fluid communication with a cryogenic vacuum pump 4, and a cryogenic refrigerator [par 0040: cold-spot] for supplying cryogen [at the liquid nitrogen temperature] to the cryogenic purification means 4 and to the cryogenic vacuum pump 4. [Par 0040: Cryopump 4 acts both as cryogenic purification means and pump means.]

**Re claim 3:** wherein the at least one of the first and second chambers in fluid communication with a cryogenic vacuum pump 4 is the second chamber 11 and 12 [see Fig 2].

**Re claim 4:** wherein the pump means comprises a transfer pump. [It is inherent that cryopump 4 is a transfer pump, because the cryopump transfers, or moves, gas from the buffer zone 12 (par 0040).]

**Re claim 5:** wherein the transfer pump 4 has an inlet [Fig 2: arrow into 4] for receiving a purge gas [buffer gas] for mixing with the drawn flow [xenon source gas] containing target material and wherein the cryogenic purification means 4 is to receive the purge gas mixed with the drawn flow from the transfer pump and to separate the purge gas from target material contained in the drawn flow [par 0040: "selectively remove xenon from a mixture of xenon and helium or argon"].

**Re claim 8:** wherein the radiation is extreme ultra violet radiation [par 0035].

**Re claim 9:** Bakker discloses an extreme ultra violet (EUV) [par 0035] lithography apparatus [Fig 2] comprising a lithography tool 1 housed in a first chamber 13, a source of EUV radiation LA housed in a second chamber 11 and 12 connected to

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the first chamber to enable EUV radiation generated by the source to be supplied to the tool [par 0041], means for supplying xenon to the source [par 0013: "a jet of...clustered xenon may be ejected from a nozzle"], pump means [cryopump 4] in fluid communication with the second chamber for drawing a gaseous flow from the second chamber [par 0040: "remove gas from the buffer zone 12"] and conveying the drawn gaseous flow to cryogenic purification means 4 for recovering xenon from the flow [par 0040: "selectively remove xenon from a mixture of xenon and helium or argon"] for subsequent re-supply to the source [par 0018: "the gases used in the source...can be regenerated for re-use relatively cheaply"], wherein at least one of the first and second chambers is in fluid communication with a cryogenic vacuum pump 4, and a cryogenic refrigerator [par 0040: cold-spot] for supplying cryogen [at the liquid nitrogen temperature] to the cryogenic purification means 4 and to the cryogenic vacuum pump 4. [Par 0040: Cryopump 4 acts both as cryogenic purification means and pump means.]

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bakker et al (2003/0142280).

Bakker discloses all limitations of the claimed invention except for wherein the at least one of the first and second chambers in fluid communication with cryogenic vacuum pump is the first chamber.

However, Bakker discloses in Fig 2 a cryopump 4 in the buffer zone 12. The pump is used to remove gas from the buffer zone (par 0040).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to insert a cryopump in the first chamber of Bakker, for the purpose of removing any unnecessary gas from the first chamber to improve the lithography conditions.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bakker et al (2003/0142280) in view of Okamura et al (6,460,348).

Bakker discloses all limitations of the claimed invention except for wherein the cryogenic refrigerator is selected from the group comprising autocascade refrigerator, a Stirling engine refrigerator, a pulse-tube refrigerator and Joule-Thomson refrigerator.

Okamura teaches, in C1L26-29, a cryopump uses a refrigerator based on a refrigerating cycle such as a pulse-tube type refrigerator.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use a pulse-tube refrigerator as the cryogenic refrigerator of Bakker, for the purpose of efficiently supplying cryogen to the cryopump.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bakker et al (2003/0142280) in view of Yogev (6,829,035).



Bakker discloses an extreme ultra violet (EUV) [par 0035] lithography apparatus [Fig 2] comprising a lithography tool 1 housed in a corresponding one of a first chamber 13, at least one source of EUV radiation LA housed in a corresponding one of a second chamber 11 and 12, at least one of the chambers 12 being in fluid communication with a cryogenic vacuum pump [cryopump 4], means for supplying xenon to at least one of the second chamber(s) 11 [par 0013: "a jet of...clustered xenon may be ejected from a nozzle"], means for supplying EUV radiation generated from the xenon by the source(s) to the tool [par 0041], means for conveying a gaseous flow output from at least one of the second chamber(s) 12 to cryogenic purification means 4 for recovering xenon from the flow [par 0040: "selectively remove xenon from a mixture of xenon and helium or argon"] for subsequent re-supply to the source(s) [par 0018: "the gases used in the source...can be regenerated for re-use relatively cheaply"], and a cryogenic refrigerator [par 0040: cold-spot] for supplying cryogen [at the liquid nitrogen temperature] to the cryogenic purification means 4 and to the cryogenic vacuum pump 4. [Par 0040: Cryopump 4 acts both as cryogenic purification means and pump means.]

Bakker does not disclose expressly the EUV lithography apparatus comprising a plurality of lithography tools.

Yogev teaches in C3L60-62, "The at least one lithography station may include a plurality of exposure tools."

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to incorporate a plurality of lithography tools in the EUV lithography apparatus of Bakker, for the purpose of increasing processing throughput.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Liu whose telephone number is 571-272-9019. The examiner can normally be reached on Monday through Friday 9 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Michael Liu  
Examiner  
Art Unit 2851

ML 3/10/08

/Diane I Lee/  
Supervisory Patent Examiner, Art Unit 2851